2012

Biology Department Newsletter, No.2

Sacred Heart University

page
01
issue no. 2
2012

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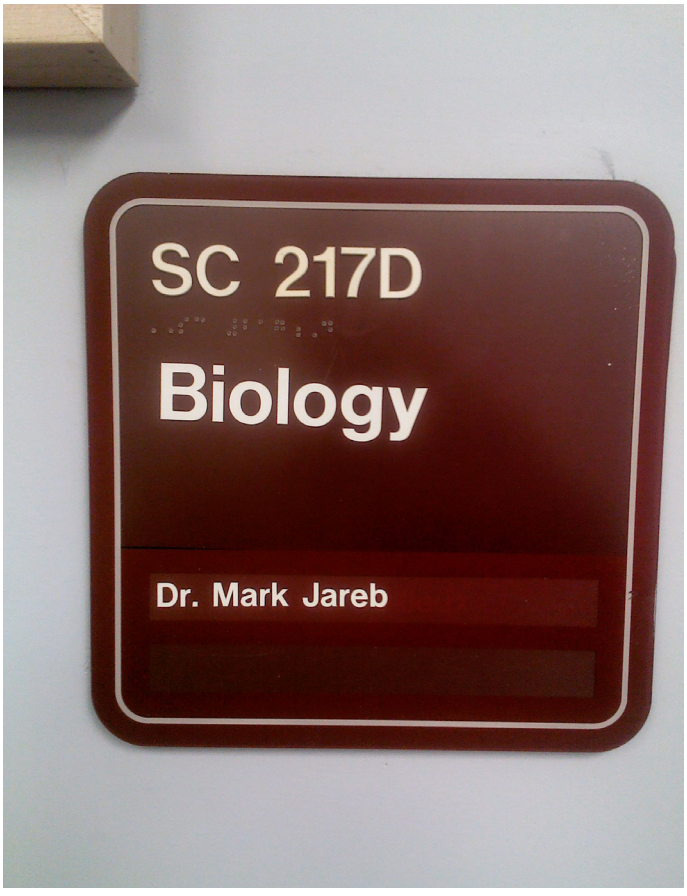
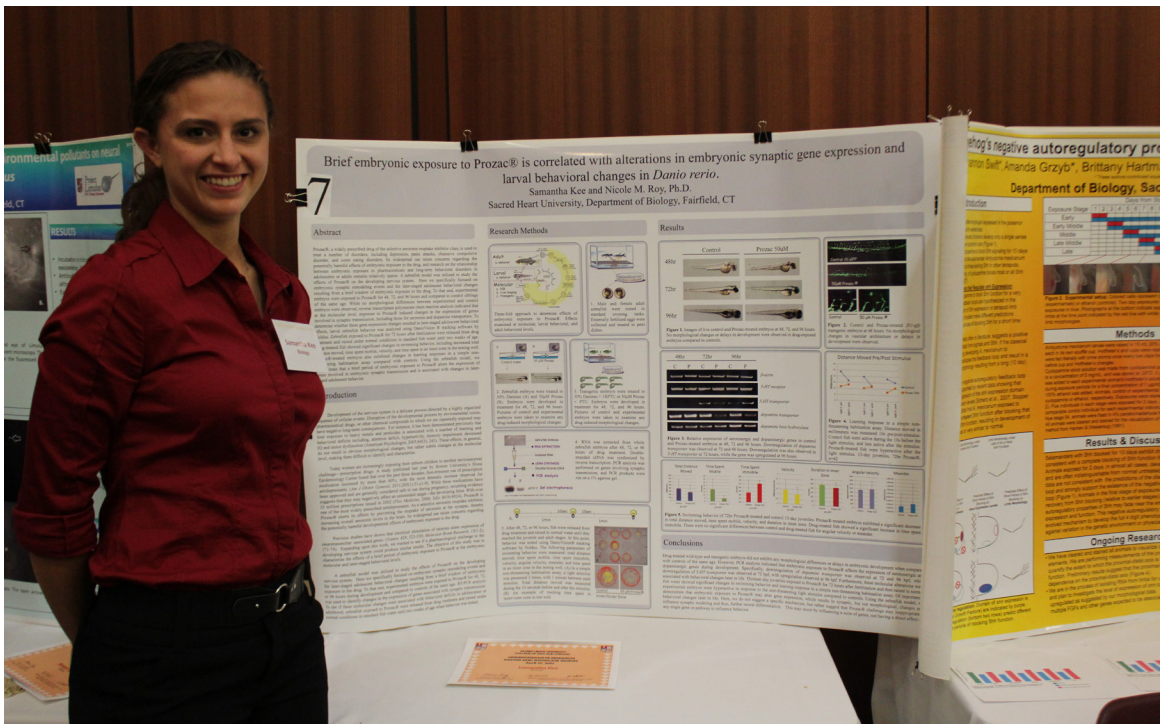
Welcome to our latest department newsletter!

Our newsletters are designed to keep faculty, staff, students and alumni connected with the program and with each other, and highlight the many accomplishments of our students, staff and faculty. We always welcome input for future editions of the newsletter, from both former and current students, so drop us a line!



The Latest

As is the custom in our department, the position of chair rotates every few years. The most recent faculty member on the hot seat, Kirk Bartholomew, handed the helm over to Mark Jareb on July 1st. Kirk's tenure as chair was a busy one. Amongst other accomplishments, we thoroughly revised our Biology core curriculum and kicked off the inaugural class of our master's program, Environmental Systems Analysis and Management (ESAM). Dr. Jareb will now oversee the continued development and refinement of these important initiatives. Drs. Roy and Terleph will be taking over Mark's former role as Pre-Health Professions Advisor for the University (yes, it takes two people to fill Mark's shoes!).



Graduating senior Samantha Kee at the SHU poster session with her award winning poster

Recent Student Research

This past April, Biology faculty and 19 research students attended the 66th annual Eastern Colleges Science Conference at William Patterson University in Wayne, New Jersey. The students presented a total of eight posters and delivered two platform presentations, representing 10 student/faculty research projects. The posters were again presented to the SHU community on April 27th, at the college's 13th Annual Undergraduate Research Poster and Showcase Session. The poster session judges gave an Outstanding Achievement Award (single author) to Samantha Kee for her poster 'Brief Embyonic Exposure to Prozac® is Correlated with Alterations in Embryonic Synaptic Gene Expression and Larval Behavioral Changes in *Danio rerio*.' Samantha also won the John C. Johnson Award for Beta Beta Beta national Biological honors for her poster. Caitlin Neary, Nicole Marciano and Jocelyn Rivas received an Excellent Award (multiple authors) at the SHU session for their poster, 'Intensity of Duet and Solo Vocalizations by the White Handed Gibbon (*Hylobates lar*).'

Geff Stopper recently presented a poster with his research student, Amanda Grzyb at the Society of Integrative and Comparative Biology meeting. The poster title was: "Sonic hedgehog's negative autoregulatory properties in salamander limb development." Other non-presenting student authors included Brooke Perlee, Shannon Swift, Ashley Engel, and Brittany Hartman.

issue no. 2
2012

New Faculty

This fall two new faculty members will be joining our department. Each will teach in both the graduate and undergraduate programs.

Dr. Michele Guidone is an ecologist specializing in marine macroalgal community dynamics. Michele obtained her B.S. in Ecology and Evolutionary Biology from the University of Connecticut and her M.S. in Biology from Southern Connecticut State University. It was during her time at SCSU that her interest in marine algae was sparked, leading her to continue her graduate studies at the University of Rhode Island. She completed her Ph.D. in Biological Sciences in May 2012. Michele's dissertation research explored interspecies diversity of and herbivore dynamics within macroalgal blooms. As a part of a multi-university collaboration, she determined the green algae biodiversity contained within algal blooms in Narragansett Bay, RI. Following the identification of several cryptically co-occurring *Ulva* (sea lettuce) species, Michele found that the coexistence of these species within a bloom is partially due to the herbivorous invertebrates that preferentially consume the competitively superior species. Michele also discovered that mud snails, the most numerous invertebrate within these blooms, facilitate bloom algae growth and potentially exacerbate bloom

Left: Michele with a large (~1.5 m) single blade of Ulva during a bloom event; Right: Dr. Steele lands a fish

Top: Dr. Steele in the field; Bottom: Dr. Guidone winter sampling at a bloom impacted site.

conditions. Currently, Michele continues to explore macroalgal bloom dynamics in collaboration with researchers at the University of Rhode Island. One ongoing project will determine how herbivorous estuarine fish utilize macroalgal mats and whether they consume bloom algae. A second project monitors reproduction pulses and overwintering strategies of bloom-forming algae. When not engrossed in algae-oriented activities, Michele enjoys hiking, gardening, and traveling.

Dr. LaTina Steele received her B.S. in Biology in 2004 and Ph.D. in Marine Science in 2010, both from the University of South Alabama (USA) in Mobile. She has worked on a multitude of projects during post-doctoral research in the Biology department at USA and at the Dauphin Island Sea Lab in Dauphin Island, AL - everything from the effects of the Deepwater Horizon oil spill on seagrass physiology and coastal fish communities to using stable isotopes to examine habitat connectivity in estuaries in the northern Gulf of Mexico and looking at the effects of habitat and predator diversity on salt marsh community structure. She has a great deal of experience working with seagrasses in the Gulf of Mexico and northwestern Atlantic, as well as in the Caribbean and Mediterranean Seas. Her areas of interest include chemical ecology, invasive species ecology, and the effects of climate on plant community structure. LaTina looks forward to teaching both undergraduate and graduate students, and hopes to develop courses in chemical ecology or marine botany in the future.

Biology Graduation Breakfast, May 13, 2012

The Department again hosted its annual graduation breakfast on May 13th. Honor cords were awarded to each of the 20 graduates that had earned a cumulative GPA of 3.5 or higher. The recipient of the gold cord for the highest GPA was given to Samantha Kee. Sam is enrolled in a Ph.D program this fall, at the Albert Einstein College of Medicine. Brittany Hannon was awarded a Silver cord for the second highest GPA. She will be doing full time research with a vascular surgeon this year, and will go on to graduate school next year. Five additional students received awards at the ceremony for their invaluable contributions to the department. These service awards went to Danielle (Peach) Burkart, Monika Kadlof, Meagan Lynch, Chris Mahl and Christina Stonoha.

Faculty at the Biology Department's annual graduation breakfast (Minus Dr. Roy who was present but meeting parents and hugging students at the time).
From the left: Mark Beekey, John Rapaglia, Geff Stopper, Jennifer Mattei, Barbara Pierce, Mark Jareb, Tom Terleph, Kirk Bartholomew, Sue Deschênes, Marian Leal and Chris Mojcik.

issue no. 2
2012

Biology Department Field Trips

SHU students (*right*) at The American Museum of Natural History in New York this past spring. In recent years, trips to this museum have become an annual event for Biology Majors.

We have hosted many Biology Department camping trips over the years, but this past year was the first ever for graduate students. We visited beaches on the South Shore of Long Island near Montauk. In addition to the usual camping fun, students learned about coastal biological and geophysical processes, and had the opportunity to work with some of the department's newest instruments.

Left: Some of the birds spotted at the camping trip: indigo bunting and sub-adult towhee; Above: Dr. Mattei looking for horseshoe crabs; Graduate students exploring the beach in Montauk.

issue no. 2
2012

John Rapaglia's Summer Research

This summer, Dr. Rapaglia (a.k.a. 'the new guy') a Biology student, Caitlin Neary, and an ESAM master's student Mike Stocker, traveled to Kiel, Germany, Lesina, Italy and Venice, Italy to take part in a European Union project designed to develop a management plans for coastal lagoons in the face of future climate change. Dr. Rapaglia, Caitlin, and Mike worked with the research group of Dr. Athanasios Vafeidis at Christian Albrechts University (CAU) in Kiel. With funding from CAU the group traveled from Kiel to Lesina, a small coastal city in Apulia, Italy. The goal of the project being to determine the current state of the Lesina Lagoon, while working directly with the National Research Council of Italy. Dr. Rapaglia, Caitlin, and Mike collected water samples from over 50 locations in the Lesina Lagoon for the analysis of a suite of water quality parameters including inorganic nutrients. In addition, 30 sediment cores were collected to understand the quality of the benthic substrate. These samples will be sent back to SHU for analysis on the department's new ICP-AES. In addition to direct measurements of water and sediment quality, the group also utilized benthic chambers in order to collect the first ever measurements of the flux of groundwater into both the lagoon and the neighboring Adriatic Sea. Braving 100+ degree temperatures the group was able to collect three tidal cycles of groundwater flux measurements. This will enable a better understanding of the complete hydrodynamics of the Lesina Lagoon. Finally it was important to garner an understanding of the land use and land cover conditions of the lagoon's drainage basin in order to constrain possible sources of contaminants into the lagoon. Utilizing Landsat TM satellite images as well as Orthophotos, Caitlin and Mike were able to classify land use changes over the past 30 years and quantify total area of each land use class. Lesina being a small town, Caitlin, Mike and Dr. Rapaglia became ambassadors of SHU in Italy and garnered much interest in our research project and university.

After the field campaign in Lesina, Mike, Caitlin and Dr. Rapaglia traveled to Venice, Italy in order to analyze the samples for macronutrients using a state-of-the-art auto analyzer. The group worked directly with the research team of Dr. Luca Zaggia at the National Research Council of Italy, whose marine science offices are in Venice. Mike and Caitlin learned the proper technique for filtering and analyzing samples from experts in the field. Finally the group spent time in Kiel, Germany, utilizing the university's GIS expertise to work on the land use model.

issue no. 2
2012

Beer Here!

Last Fall, as part of our Biology curriculum makeover that aims to improve pedagogy and engagement, over 300 students enrolled in Concepts in Biology made their own beer in our labs. Students started with barley seeds and germinated them (a standard part of the malting process necessary for brewing) in order to coerce the seeds into releasing important enzymes that degrade the starch stores into sugars that are accessible for use as food by the plant—or, in the case of brewing, as food by brewer's yeast. After germinating, the barley was kilned to dehydrate it, thus killing the plant and stabilizing the enzymes. The subsequent step—mashing—requires heating of the grain in an oatmeal-like mixture of the malted barley and water to temperatures at which the enzymes work very efficiently. Two very important enzymes —amylases—act to further break down starches at these temperatures. But the two enzymes create different types of resulting sugars; one results in a high portion of very fermentable sugars, and one in a high portion of unfermentable sugars. Those enzymes each have a different optimal temperature and pH. Students designed their own experiments by choosing to vary the temperature or pH of mash samples to test its effect on the fermentability of the sample. After separating the sugary liquid from the grain, the samples were inoculated with brewer's yeast. By measuring the change in mass of the samples during fermentation, students calculated the number of molecules of carbon dioxide produced during fermentation (the mass of which is lost to the air), which is equal to the number of ethanol molecules created. Using this information, students calculated the percent alcohol in their beers. Beers with mash conditions with high fermentability created dry beers with slightly higher alcohol. Beers with mash conditions with low fermentability created more sweet, malty, and fuller-bodied beers. The lab was developed by Dr. Stopper and Dr. Bartholomew. The faculty and students found this to be a very engaging way to learn about macromolecules important to biology (enzymes and carbohydrates), some organismal biology (barley germination and yeast metabolism), and many important concepts of scientific experimentation and analysis. And no, unfortunately we couldn't engage in drinking it!

page
10
issue no. 2
2012

Shelob has been the Biology department's pet tarantula since March of 2004!

Newsletter editor: Thomas A. Terleph

Designer: KLN Editions

Cover illustration: Katie Hjort '08

Photo credits: Tom Terleph: pages 2, 3, 6, 7; Michele Guidone and LaTina Steele: pages 4 and 5; Caitlin Neary: page 8; Geff Stopper: page 9.